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ENCLOSURES *(Check all that apply)*

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Remarks

2nd Substitute Brief on Appeal Under 37 CFR 41.37(c)

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Ferrells, PLLC		
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Date	August 2, 2006	Reg. No.	31,158

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	:	
Randy D. Jester	:	Examiner: M. Miggins
U.S. Serial No. 10/720,028	:	Group Art Unit: 1772
Filed November 21, 2003	:	
Docket No. 1725 (TI-02-3)	:	
For: CYCLOOLEFIN COPOLYMER HEAT SEALABLE FILMS AND PACKAGING INCORPORATING SAME	:	

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SECOND SUBSTITUTE BRIEF ON APPEAL UNDER 37 CFR §41.37(c)

Sir:

Applicant hereby submits this *Second Substitute Brief on Appeal* in the above-noted United States Patent Application. Applicant submitted a previous Substitute Brief in response to a May 2, 2006 *Notification of Non-Compliant Appeal Brief* for perceived technical deficiencies. A second *Notification of Non-Compliant Appeal Brief* was received in this case, dated July 27, 2006, alleging additional technical deficiencies. In accordance with that notification, this *Second Substitute Brief* will replace the *Substitute Brief* filed on May 5, 2006. A *Notice of Appeal* was submitted on December 21, 2005 appealing the rejection of Claims 1-30.

I. REAL PARTY IN INTEREST

The real party in interest in this case is Topas Advanced Polymers, Inc.

II. RELATED APPEALS AND INTERFERENCES

There are no related appeals, interferences or judicial proceedings related to, or which will affect, or which will be affected by, or which will have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-30 stand finally rejected in this application and are on appeal. A complete listing of claims on appeal is provided in Section VIII-Claims Appendix.

IV. STATUS OF AMENDMENTS

No amendments to the claims or specification have been filed subsequent to the *Final Rejection* of October 5, 2005. A *Declaration* submitted under § 1.132 was entered after the *Final Rejection* on December 7, 2005.

V. SUMMARY OF CLAIMED SUBJECT MATTER

For purposes of this *Appeal*, the pending claims are divided into four (4) groups as follows:

Group I includes Claims 1-17, 19-23, and 26-29;

Group II includes Claim 30;

Group III includes Claims 18 and 24; and

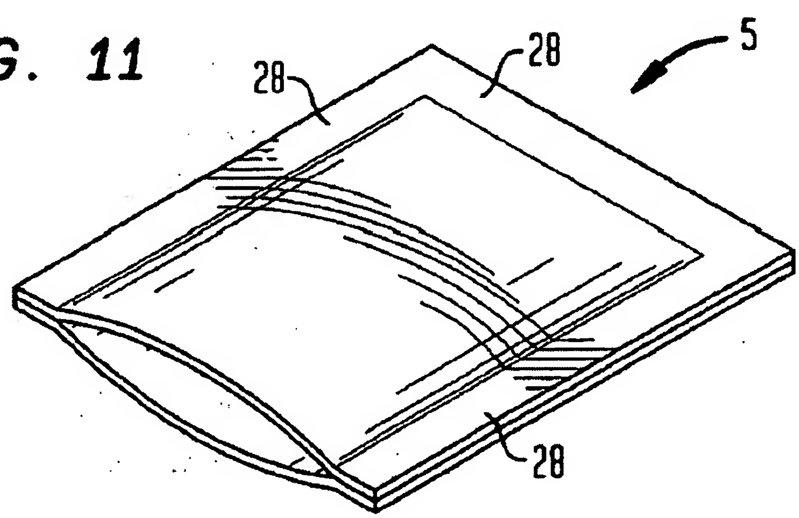
Group IV includes Claim 25.

Each of the above groups is believed independently patentable for the reasons discussed herein.

The present invention is directed to a polymeric film that is suitable for heat sealing at low temperatures, where the film consists essentially of a cycloolefin copolymer ("COC") having a glass transition temperature in the range of 30°C to 55°C. *See*, Application as originally filed at page 3, lines 1-5.

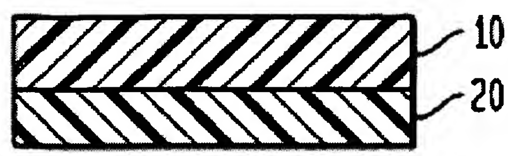
The subject matter of the invention for all of the above claim groupings may be further illustrated in reference to the specification and figures. For example, **Fig. 11** of the pending application, reproduced below, illustrates a heat sealed package produced according to the invention.

FIG. 11



According to the invention, the COC films may be incorporated into the package by themselves or as part of a multilayered laminate as is illustrated in **Fig. 7** below. **Fig. 7**. shows a cross-sectional view of the laminate where **10** is a thermoplastic layer and **20** is the heat sealable COC layer. *See*, application as originally filed at page 32, lines 16-17.

FIG. 7



Referring to **Fig. 11** above, the films or laminates of the invention are desirably incorporated into the package **5**, where the COC layer is heat sealed at low temperatures on the periphery **28** of the package. *See*, Application as originally filed at p. 33, lines 1-3.

Claim 1 is representative of Group I:

> 1. A heat-sealable film suitable for heat sealing at low temperatures comprising at least one layer consisting essentially of a cycloolefin copolymer (COC), wherein the COC has a Tg of from about 30 to about 55°C.

The claims in group I accordingly relate to a low temperature heat-sealable film which consist essentially of a COC resin with the recited Tg. *See*, application as originally filed at page 3, lines 1-5.

Claim Group II, which consists of claim 30, is directed to a norbornene/ethylene copolymer having a Tg of from about 30°C to about 55°C. Claim 30 is reproduced below:

30. A cycloolefin copolymer consisting of norbornene and ethylene, wherein the cycloolefin copolymer has a Tg of from about 30 to about 55°C and wherein the norbornene is present in an amount of from about 24 to about 30 mole percent and wherein the ethylene is present in an amount of from about 76 to about 70 mole percent.

See, application as originally filed at page 7, lines 24-25.

Claim Group III is directed to a heat sealed package having a layer that consists essentially of COC resin (Tg 30°C-55°C), where the heat seal is effected at a low temperature. Claim 24 is representative of Claim Group III:

24. A method of sealing a heat sealed package comprising providing a film of Claim 1 and heat bonding the film to another layer at a heat seal temperature of from about 50°C to about 80°C.

See, application as originally filed at page 15, lines 1-5.

Claim Group IV relates to a method of heat sealing two films together at a low temperature, where both films consist essentially of COC resin. Claim Group IV consists of Claim 25:

25. A method of heat sealing comprising:

(a) providing a first film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C;

(b) providing a second film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C; and

(c) heat-sealing the first and second films together wherein the sealing temperature is from about 50 to about 80°C.

See, application as originally filed at page 15, lines 1-20.

A complete listing of all claims on appeal appears in Section VIII-Claims Appendix to this *Brief.*

ADDITIONAL EVIDENCE SUBMITTED BEARING UPON PATENTABILITY

A July, 2005 *Declaration* was entered by the Examiner on July 12, 2005, and a November, 2005 *Declaration* was entered by the Examiner on December 7, 2005.

The *Declarations* submitted in this case are discussed in further detail in connection with the patentability of the pending claims in Section VII, below.

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Claims 1-30 are rejected under 35 U.S.C. § 102(e) as anticipated by *Hirose et al.* (US 5,532,030).

B. Claims 1-30 are rejected under 35 U.S.C. § 103 as being obvious over *Hirose et al.* (US 5,532,030) in view of *Hausmann* (US 2002/0156195).

VII. ARGUMENT

In the *Final Rejection* of October 5, 2005, two (2) grounds of rejections were maintained. All pending claims (1-30) were rejected under § 102 as being anticipated by United States Patent

No. 5,532,030 to *Hirose et al.*, and under § 103 as being obvious over *Hirose et al.* in view of United States Patent Application Publication No. 2002/0156195 to *Hausmann.*

All rejections should be withdrawn and this application passed to issue for the reasons discussed herein.

A. 35 U.S.C. § 102(e) rejection over *Hirose et al.*

1. Claim Group I

As mentioned above, the claims in Group I are directed to a film that is suitable for heat sealing at low temperatures, where the film has at least one layer which consists essentially of a cycloolefin polymer that has a Tg of from 30-55°C.

The *Hirose et al.* reference does not sufficiently describe the claimed invention to support a rejection under § 102. In this regard, it is noted that the *Hirose et al.* reference discloses the use of a COC resin which may have a vast range of glass transition temperatures, and which may be included in an olefin blend in any amount. The generalized disclosure of *Hirose et al.* does not support a proper rejection under § 102. To be an anticipating reference under § 102, the reference must sufficiently describe the claimed invention to have placed the public in possession of it, *i.e.*, where one of ordinary skill in the art can combine the publication's description of the invention with his own knowledge to make the claimed invention. *In re Donohue*, 226 USPQ 619, 621 (Fed. Cir. 1985). Put otherwise, in order to be anticipating, a reference must disclose the claimed subject matter with reasonable specificity.

The *Hirose et al.* reference does not provide any guidance on how to make the films of the invention. As stated in the July, 2005 *Declaration of Randy D. Jester* at paragraph 6:

6. That, in his technical opinion, neither the *Hausmann* nor the *Hirose* reference provide guidance to a person of ordinary skill in the art on how to make films

which are suitable for low temperature heat sealing, or which contain a layer consisting essentially of a cycloolefin copolymer with a Tg of between about 30 and 55 °C. That this opinion is based, in part, on the absence of any teaching in those references of which, if any, COC resins would be suitable for low temperature applications or how much resin to use.

Hirose et al. does not teach films which are suitable for low temperature heat sealing, *i.e.*, sealing temperatures of less than about 80°C (*see*, application as filed at page 2, lines 20-21) . While *Hirose et al.* vaguely mentions the heat sealability properties of the laminates, it is apparent that *Hirose et al.* is describing conventional heat sealing processes. For instance, the examples in *Hirose et al.* are heat sealed at temperatures in the range of from 110°C to 130°C, and are reported to perform better at the higher temperatures.

Regarding the glass transition temperature of the resins, *Hirose et al.* teaches films which may include COC resins having a Tg in the expansive range of -10°C to 170°C. As stated in col. 3 of *Hirose et al.*:

> **The cycloolefin-based (A1) resin has further a glass transition temperature (Tg) of, usually, −30° C. or higher, preferably −10°–170° C., and a degree of crystallinity of, usually, 0 −20%, preferably 0–2%, as determined by X-ray diffraction method.**

Where the prior art discloses a range of values which encompass the claimed range, as here, the law is clear that the narrower claimed range may be patentable. *See, e.g.*, *Iron Grip Barbell Co. v. USA Sports Inc.*, 73 USPQ2d 1225, 1228 (Fed. Cir. 2004). Indeed, the reference is only anticipatory if the claimed subject matter is disclosed with sufficient specificity. MPEP § 2131.03, second heading. Whether the range is disclosed with sufficient specificity is fact dependent. As stated in the MPEP:

> tute an anticipation under the statute." What constitutes a "sufficient specificity" is fact dependent. If the claims are directed to a narrow range, the reference teaches a broad range, and there is evidence of unexpected results within the claimed narrow range, depending on the other facts of the case, it may be reasonable to conclude that the narrow range is not disclosed with "sufficient specificity" to constitute an anticipation of the claims. The unexpected results may also render the claims unobvious. The question of "sufficient specificity" is similar to that of "clearly envisaging" a species from a generic teaching. See

In this case, the Tg range disclosed by *Hirose et al.* is <u>over seven times</u> more expansive than the claimed range of 30-55°C.[1] A range that spans 180°C does not sufficiently describe the claimed range, which spans 25°C, especially where the claimed Tg range is critical to the superior heat sealing performance of the invention and the enhanced properties are entirely unexpected. *See*, July, 2005 *Declaration* at paragraphs 5, 7, and 9.

A similar scenario was decided recently in *Atofina v. Great Lakes Chemical Corp.*, 78 USPQ2d 1417 (Fed Cir. 2006), where the court held that a prior art reference which disclosed a temperature range of from 100°C to 500°C with a preferred range of 150°C to 350°C, did not anticipate a claimed range of from 330°C to 450°C. As stated in that opinion:

> We agree with Atofina that the district court clearly erred in finding that JP 51-82206 anticipates the '514 patent. Anticipation requires a showing that each limitation of a claim is found in a single reference, either expressly or inherently. Perricone v. Medicis Pharm. Corp., 432 F.3d 1368, 1367 [77 USPQ2d 1321] (Fed. Cir. 2005). However, each limitation of the '514 claims is not in JP 51-82206. It is well established that the disclosure of a genus in the prior art is not necessarily a disclosure of every species that is a member of that genus. See, e.g., In re Baird, 16 F.3d 380, 382 [29 USPQ2d 1550] (Fed. Cir. 1994). There may be many species encompassed within a genus that are not disclosed by a mere disclosure of the genus. On the other hand, a very small genus can be a disclosure of each species within the genus. In re

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[1] *Note* that the November 2005 Declaration of Randy D. Jester establishes that the softening temperature which is noted in *Hirose et al.* (and apparently cited by the Examiner in the Final Office Action), is not equivalent to, or suggestive of the glass transition temperature.

> Petering, 301 F.2d 676, 682 [133 USPQ 275] (C.C.P.A. 1962); see also Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc., 246 F.3d 1368, 1380 [58 USPQ2d 1508] (Fed. Cir. 2001) ("[T]he disclosure of a small genus may anticipate the species of that genus even if the species are not themselves recited."). That is not the case here, however. A temperature range of over 100 degrees is not a small genus and the range of temperatures of JP 51-82206 does not disclose Atofina's temperature range.
>
> [4] To find anticipation here, the district court relied on our opinion in Titanium Metals. The court stated that "the '514 patent's claim limitation of 330 to 450 °C is entirely within JP 51-82206's temperature range of 100 and 500 °C. Consequently, this limitation of claim 1 is also disclosed by JP 51-82206." Opinion, slip op. at 41. However, Titanium Metals stands for the proposition that an earlier species reference anticipates a later genus claim, not that an earlier genus anticipates a narrower species. 778 F.2d at 782. <u>Here, the prior art, JP 51-82206, discloses a temperature range of 100 to 500 °C which is broader than and fully encompasses the specific temperature range claimed in the '514 patent of 330 to 450 °C. Given the considerable difference between the claimed range and the range in the prior art, no reasonable fact finder could conclude that the prior art describes the claimed range with sufficient specificity to anticipate this limitation of the claim.</u> Because the court's determination that JP 51-82206 disclosed the temperature range in claims 1, 2, 6, 7, 9, and 10 of the '514 patent was grounded in its erroneous application of Titanium Metals, we must reverse its finding of anticipation based on the temperature range.
>
> Further, we reject Great Lakes' argument that the district court's finding of anticipation was correct because JP 51-82206 discloses a preferred embodiment using a specific temperature range (a species) that anticipates the '514 patent's claim of a broader temperature range (a genus). JP 51-82206 discloses a preferred temperature range of 150 to 350 °C that slightly overlaps the temperature range claimed in the '514 patent. But that slightly overlapping range is not disclosed as such, i.e., as a species of the claimed generic range of 330 to 450 °C. <u>Moreover, the disclosure of a range of 150 to 350 °C does not constitute a specific disclosure of the endpoints of that range, i.e., 150 °C and 350 °C, as Great Lakes asserts. The disclosure is only that of a range, not a specific temperature in that range, and the disclosure of a range is no more a disclosure of the end points of the range than it is of each of the intermediate points. Thus, JP 51-82206 does not disclose a specific embodiment of the claimed temperature range.</u>

Id. at 1423-1424 (emphasis added).

The facts of the *Atofina* case are strikingly similar to the issue in the pending application. In *Atofina*, the claimed temperature range was approximately 30 % of the genus that was disclosed in

the prior art. The claims in the pending application, as amended, represent only about 14 % of the broad range disclosed in *Hirose et al.* Thus, the claimed range is not taught with sufficient specificity by the prior art range given their "considerable difference" in breadth.

Furthermore, whereas the present invention requires that the film *consist essentially* of the COC resin, the *Hirose et al.* discloses a layer (A) which may comprise 1) a copolymer of a cycloolefin, 2) a ring-opening polymer of a cycloolefin or a hydrogenation product thereof, 3) a graft-modifed resin that is based on a cycloolefin monomer, or 4) a blend of polyolefin and any of the preceding resins. *See Hirose et al.* at col. 1, line 55 through col. 2, line 11. Indeed, in defining the COC layer, the *Hirose et al.* patent appears to teach that every possible variation of COC polymer blends are suitable for the laminates. *See*, *e.g.*, col. 29, lines 55-66; col. 30, lines 38-46.

Here again, the expansive disclosure is not believed to sufficiently describe a low temperature heat sealable film that *consists essentially* of the COC resin. This feature of the present invention is likewise critical to achieve the superior low temperature heat sealing properties; as noted above, even when COC films contain only 20 % of other resins, unacceptable heat sealing properties are experienced. See, *e.g.*, **Figs. 3** and **4** of the application as originally filed, where it is shown that even modest amounts of additional polymers raise the ideal sealing temperature up to about 100-110°C (where the hot tack and ultimate seal strengths reach their maximum values).

In sum, the *Hirose et al.* reference is a very generalized disclosure relating to laminates which include cycloolefin polymers, and in no way enables the production of low temperature heat sealing films that consist essentially of COC resin with the claimed Tg. On this point *Minnesota Mining and Manufacturing Co. v. Johnson & Johnson Orthopaedics Inc.* is apropos:

> The Master found no anticipation because the Straube patent does not include any mesh size or thickness parameter for the knit fiberglass fabric substrate mentioned in the Garwood claim. The Master found that the ranges 3M extrapolated from Straube are "so broad as to be meaningless to one skilled in the art. The Straube patent provides no guidance as to how to construct a fiberglass cast with the beneficial properties achieved by the Garwood invention; strength, porosity, lightness, and ability to

> cure quickly." The Master recognized that although Garwood's specific claims are subsumed in Straube's generalized disclosure of knit fiberglass as a substrate, this is not literal identity. The Master also relied on the fact that the PTO specifically considered the effect of the Straube patent on the Garwood application. Where the PTO has considered a piece of prior art, and issued a patent notwithstanding that prior art, a court owes some deference to the PTO's decision. American Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1360, 220 USPQ 763, 771 (Fed. Cir.), cert. denied, 469 U.S. 821 [224 USPQ 520] (1984).
> [8] We find no error in the Master's determination that Straube does not anticipate. <u>In order to anticipate, the Straube patent must sufficiently describe the claimed invention to have placed the public in possession of it. The record establishes that the Straube patent does not do this. It merely states in a very general way that fiberglass can be used as a substrate.</u> However, neither the information provided in the Straube patent nor 3M's interpretation thereof are exact enough to identify the ranges claimed in Garwood.

25 USPQ2d 1321, 1332 (Fed. Cir. 1992) (emphasis added).

Hirose et al. only discloses, in a very general way, that cycloolefins can be used in laminate structures. The ranges and compositions described in *Hirose et al.* are also "so broad as to be meaningless" and provided no guidance on how to construct films having the beneficial low temperature heat sealing properties of the present invention.

Accordingly the rejection over *Hirose et al.* should be withdrawn. The additional claim groupings are believed independently patentable as is discussed below.

2. <u>Claim Group II.</u>

Claim Group II consists of claim 30 which is directed to a specific norbornene/ethylene copolymer:

> 30. A cycloolefin copolymer consisting of norbornene and ethylene, wherein the cycloolefin copolymer has a Tg of from about 30 to about 55°C and wherein the

> norbornene is present in an amount of from about 24 to about 30 mole percent and wherein the ethylene is present in an amount of from about 76 to about 70 mole percent.

As with the claims in Group I, *Hirose et al.* does not disclose, with the required specificity, copolymers which have a glass transition temperature in the claimed range. Furthermore, *Hirose* does not teach a polymer consisting essentially of norbornene and ethylene in the recited amounts. While the *Hirose et al.* generally discloses broad ranges for the amount of cycloolefin monomer in the polymer, it also teaches that specific monomers such as norbornene should be present in less than 20 mole percent, and preferably less than 10 mole percent. *See*, *Hirose et al.* at col. 23, line 4 through col. 24, line 2. Accordingly, the *Hirose et al.* reference does not disclose the subject matter of Group II.

3. Claim Group III.

The Group III claims are directed to a heat sealed package that includes a film from the Group I claims, *i.e.*, a film which consists essentially of a COC resin with a glass transition temperature in the range of from 30-55°C. The claims in Group III are believed independently patentable because they recite that the film is bonded to another layer at a low sealing temperature. Claim 24 is representative:

> 24. A method of sealing a heat sealed package comprising providing a film of Claim 1 and heat bonding the film to another layer at a heat seal temperature of from about 50°C to about 80°C.

The rejections of the Group III claims over the art of record are clearly untenable and should be withdrawn. The *Hirose et al.* reference states that the laminates are heat sealable, but gives no indication about whether the films may be heat sealed at low temperatures. Indeed, no preferred heat sealing temperatures are disclosed. The only heat sealing temperatures disclosed in the *Hirose et al.* patent are in the Examples where the laminates are heat sealed at temperatures of 110°C, 120°C, and

130°C. *See*, Table 1 of *Hirose et al.* Not only are the temperatures disclosed by *Hirose et al.* significantly higher than the claimed range, but the laminates in *Hirose et al.* generally achieve better heat sealing strengths at the higher temperatures, *i.e.*, 130°C. *See*, Examples 12 and 13 of *Hirose et al.* Accordingly, the *Hirose et al.* reference is not suggestive of a heat seal that is effected at low temperatures. The combined recitation of glass transition temperature and sealing temperature is clearly patentable over the art of record.

4. Claim Group IV

Claim Group IV consists of claim 25 and contains many of the same features as Claim Groups I and III. Accordingly, the Group IV claims are believed allowable for the reasons enumerated above. Additionally, claim 25 recites a method of heat sealing where two COC films of the invention are heat sealed *together* at a low temperature. Claim 25 is reproduced below:

> 25. A method of heat sealing comprising:
>
> (a) providing a first film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C;
>
> (b) providing a second film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C; and
>
> (c) heat-sealing the first and second films together wherein the sealing temperature is from about 50 to about 80°C.

As mentioned above, the *Hirose et al.* reference is not suggestive of a low temperature heat sealing process and, accordingly, does not teach to heat seal a film at a temperature of about 50°C to about 80°C. The claims in Group IV are further patentable over the *Hirose et al.* reference because *Hirose et al.* does not teach that a cycloolefin-containing film should be heat sealed to a like

cycloolefin film. Indeed, in the only detailed description of a heat sealed film disclosed in *Hirose et al.*, it teaches to extrude a laminate having a cycloolefin layer that is sandwiched between two alpha-olefin layers. The laminate is then sealed to "a layer of heat sealable resin" of an undisclosed composition. *See Hirose et al.* at col. 42, lines 15-27. As such, the *Hirose et al.* patent does not disclose that the COC layer is heat sealed to *anything*, and it certainly does not teach to heat seal the layer to another layer which consists essentially of COC resin.

B. § 103 rejection over *Hirose et al.* in view of *Hausmann*

While most of the rejections over the *Hausmann* publication were withdrawn in the Office Action dated October 5, 2005, the Examiner maintained the § 103 rejection of the claims over *Hirose et al.* in view of *Hausmann.* This ground of rejection is also improper.

1. Claim Group I

The obviousness rejection maintained by the Examiner in the final action, refers back to the April 27, 2005 Office Action at paragraph 10:

> Hirose fails to teach that its laminates are easily heat sealed.
>
> Hausmann is discussed above. Note that, in its abstract, it teaches that its copolymers have improved heat seal initiation properties.
>
> Hirose and Hausmann are analogous because both deal with ethylene/norbornene copolymers used in sealant applications.
>
> It would have been obvious to one having ordinary skill in the art at the time of the invention to employ the copolymers of Hausmann in the laminates of Hirose in order to facilitate the production of the Hirose laminates.

The combination of the *Hausmann* polymers in the laminates of the *Hirose et al.* reference fails to suggest several salient features of the claimed invention, in addition to the deficiencies outlined above with respect to *Hirose et al.* The *Hausmann* reference is directed to a *blend* of

polymers that contains a *minor* amount of cycloolefin resin. As stated in paragraphs 0038 and 0028 of *Hausmann*:

> **[0038]** The incorporation of about 0.1 to 50% of a cycloolefin polymer in a film made of a polar ethylene based polymer according to the invention can have many advantages: it improves the perforation resistance of said film, it reduces its heat seal initiation temperature, it increases its hot tack strength. It can also stabilize its heat seal strength over a wide temperature range, for instance for temperatures ranging from 80° C. to 150° C. It then allows to obtain a low seal strength and an easy openability of the film.
>
> **[0027]** The polar derivative of the ethylene based polymer is usually present in the blend of the invention in an amount from about 50 weight % to 99.9 weight %, relative to the weight of the blend.

Thus, the films in *Hausmann* include less than 50 % of the cycloolefin polymer. This is hardly suggestive of the claims in Group I, which require that the film consists essentially of the COC resin. As has been shown, the addition of other polymers in amounts as low as even 20 percent, negatively effect the basic and novel characteristics of the invention. *See*, July, 2005 *Declaration* at paragraph 8.

Furthermore, the *Hausmann* reference is even more vague about the Tg of the cylcoolefin resin than the *Hirose et al.* reference; as stated in paragraph 0028:

> **[0028]** The second essential component of the blend of the invention is a cycloolefin polymer. Suitable cycloolefin polymers for the invention have a mean molecular weight Mw (weight average) in the range from 200 to 100,000. They are substantially amorphous, i.e. have a crystallinity of less than 5% by weight. They preferably show a glass transition temperature Tg, which is generally in the range from 0 to 300° C. The polydispersity Mw/Mn of the cycloolefin polymers is preferably from 1 to 5.

The 0-300°C temperature range disclosed in *Hausmann*, is 12 times greater than the claimed Tg range of 30-55°C. Here again, this does not adequately describe the claimed invention.

Additionally, while the *Hausmann* reference notes the importance of reducing the heat sealing temperature, the differences between the inventive films and those in the *Hausmann* reference are further underscored by paragraphs 0064 and 0068 of the *Hausmann* publication where it can be seen that the hot tack values of the *Haussman* films reach their peak values at a sealing temperature of around 100°C-110°C, and the ultimate seal strengths reach their peak at 150°C or more. By contrast the inventive films have generally achieve maximum hot tack values at a sealing temperature of less than about 80°C (**Fig. 5**), and the ultimate seal strengths peak at a temperature of between about 80-100°C (**Fig. 6**).

The claims in Group I are, therefore, believed in condition for allowance.

<u>2. Claim Group II</u>

The claims of Group II are directed to specific copolymers of norbornene and ethylene. Specifically, the copolymers of group II have from about 24 to about 30 mole percent norbornene and about 70 to 76 mole percent ethylene. The *Hausmann* reference discloses the use of a COC resin which includes a cycloolefin monomer and a comonomer, where the comonomer is present in amounts of <u>at most</u> 20 wt. percent. As stated in paragraph 0029 of *Hausmann*:

> **[0029]** Cycloolefin polymers (COPs) are homopolymers built up from only one type of cycloolefins or copolymers built up from cycloolefins and comonomers (COCs), where the comonomer content is at most 20% by weight, based on the weight of the cycloolefin polymer. Cycloolefins are

In contrast to *Hausmann*, the norbornene copolymers embodied in claim 30 of the pending application have ethylene in amounts of from 70-76 mole percent, which corresponds to about 41-48 weight percent—over twice the maximum amount of comonomer contemplated in the *Hausmann* reference, which accordingly teaches away from Claim Group II. Thus, claim 30 should be allowed.

3. Claim Group III

As noted above, the Group III claims are directed to heat sealed films consisting essentially of COC resin, where the heat seal is effected at a low temperature. Regarding these claims, we note again that the films in *Hausmann* do not teach several elements of the inventive films. While *Hausmann* discloses examples of heat seals that are effected at the upper range of the claims (about 80°C), those seals are performed on films which have no more than 20 percent of cycloolefin copolymer—thus, not consisting essentially of the COC resin.

4. Claim Group IV

The claims of Group IV are most clearly patentable over the art of record. The Group IV claims relate to a heat seal which includes two films that consist essentially of COC resin, where the film is effected at low temperatures. Applicant notes again that the films in *Hausmann* contain less than 50 percent of COC resin, and that the Tg of the resin may be anywhere from 0-300°C. Accordingly, the combination of *Hirose et al.* and *Hausmann* is not suggestive of the claimed subject matter. Accordingly, the rejections of the Group IV claim should be withdrawn.

FURTHER REASONS FOR ALLOWANCE

The invention disclosed in the pending application is a significant advancement in packaging films, enabling low temperature heat sealing and higher production speeds. Such useful advances are patentable, absent art which discloses or teaches the claimed invention.

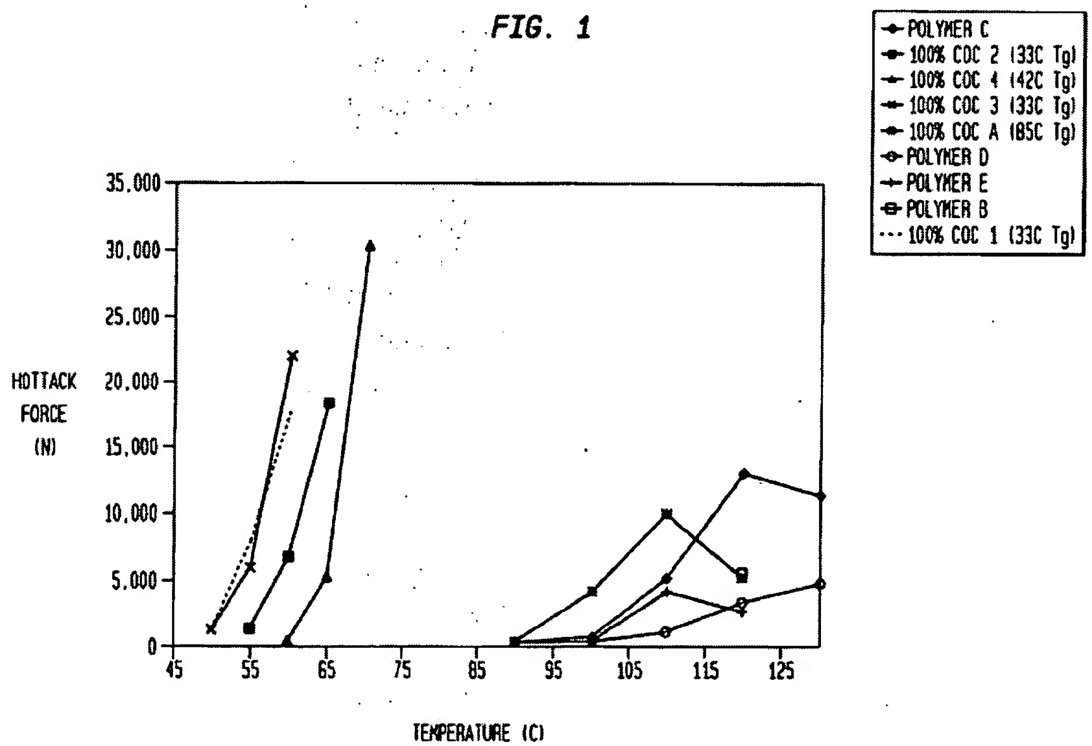
See, In re Wright, 122 USPQ 522, 524 (C.C.P.A. 1959):

> Though the court may have believed that each of the elements in the patented device was old, it does not follow that the combination was unpatentable. We need not elaborate upon the rule that a novel combination of old elements which so cooperate with each other so as to produce a new and useful result or a substantial increase in efficiency, is patentable. See

Lewyt Corp. v. Health-Mor, Inc., 7 Cir., 181 F.2d 855, 85 USPQ 335 , certiorari denied 340 U.S. 823, 71 S.Ct. 57, 95 L.Ed. 605, 87 USPQ 432 ; Blaw-Knox Co. v. Lain Co., 7 Cir., 230 F.2d 373, 108 USPQ 356 . Weller Manufacturing Company v. Wen Products, Inc., 7 Cir., 231 F.2d 795, 798, 109 USPQ 73, 75 (1956).

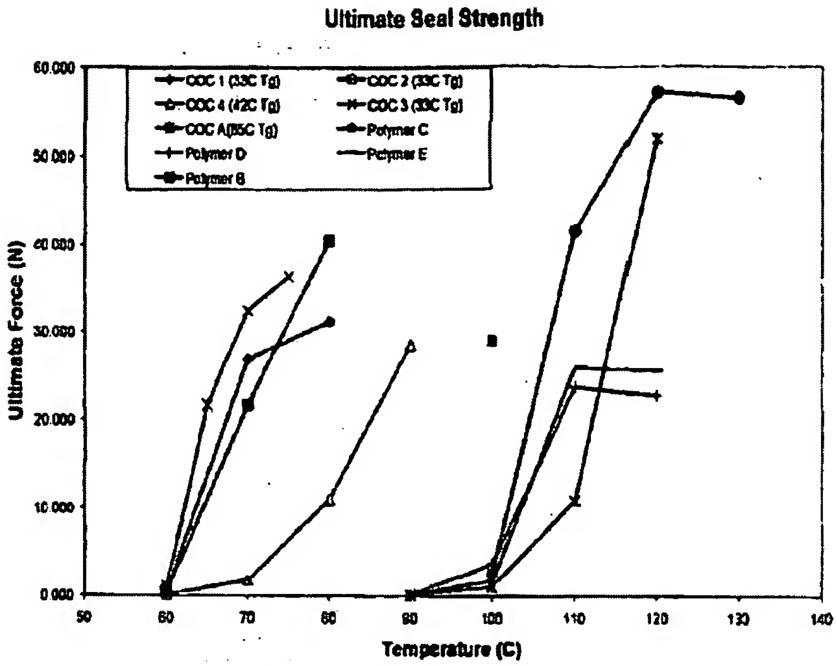
Here, the films of the invention exhibit substantially superior hot tack strength values; in some cases more than 6 times that of conventional films. This is quite remarkable, considering that these values are achieved at temperatures of more than 40°C lower that of the conventional films. *See*, **Fig. 1** of the pending application:

FIG. 1



Furthermore, the inventive films have been shown to achieve comparable or better ultimate seal strengths than conventional films. As shown in **Fig. 2**:

Figure 2



As can be seen from **Figs. 1** and **2** above, the films of the invention (left side) achieve higher maximum hot strength values than conventional films (right side); in some cases the maximum hot tack strength values are significantly higher than prior art films. Additionally, the maximum seal strength values of the inventive films are achieved at significantly lower temperatures than the conventional films—in most cases the difference is 30°C or more. The strength properties are unexpectedly high, because conventionally, seal strengths are expected to decrease with lower Tg resins. *See*, July 2005 *Declaration of Randy D. Jester* at paragraph 7:

> 7. That the inventive films enable the production of seals with unexpectedly high strengths at low sealing temperatures. That the high strength values are unexpected because the glass transition temperatures of the COC resins are much lower than most conventional heat sealing resins, and that one would expect a significant decrease in seal strength based on the Tg values used. That the high strengths of the present invention are shown in **Figures 1** and

2, reproduced below, where the inventive low temperature seals have higher hot tack strengths and comparable or better ultimate seal strengths than standard films.

It is further surprising that the COC films must consist essentially of the COC resin to achieve the superior seal strengths. *See*, July 2005 *Declaration* at paragraph 8:

> 8. That it is also surprising that the films which consist essentially of COC resin perform markedly better for low-temperature applications than blends of COC having modest amounts of another polyolefin. That this opinion is based on Samples 35-38 of the pending application which show that blends having even 20 % of LLDPE reach their peak seal strength values at temperatures substantially higher than the inventive films.

Other unique features of the inventive films include a broad tolerance for processing temperature variation. *See*, **Figs. 5** and **6** of the application as originally filed.

In sum, as stated in the July, 2005 *Declaration* at paragraph 9, "[T]he inventive films have a combination of properties that are not expected, and are highly desirable for low-temperature heat seal applications." Where an applicant demonstrates superior results and states that they are unexpected, issuance is warranted. *See*, In *re Soni,* 34 USPQ2d 1684, 1687-1688 (Fed. Cir. 1995):

> In our view, however, when an applicant demonstrates substantially improved results, as Soni did here, and states that the results were unexpected, this should suffice to establish unexpected results in the absence of evidence to the contrary. Soni, who owed the PTO a duty of candor, made such a showing here. The PTO has not provided any persuasive basis to question Soni's comparative data and assertion that the demonstrated results were unexpected. Thus, we are persuaded that the Board's finding that Soni did not establish unexpected results is clearly erroneous.

VIII. CONCLUSION

For the above reasons, all outstanding rejections should be withdrawn and all claims should be allowed to issue.

Respectfully submitted,

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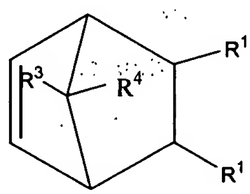
August 2, 2006

VIII-CLAIMS APPENDIX

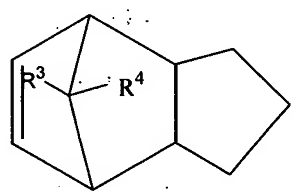
1. A heat-sealable film suitable for heat sealing at low temperatures comprising at least one layer consisting essentially of a cycloolefin copolymer (COC), wherein the COC has a Tg of from about 30 to about 55°C.

2. The film as claimed in Claim 1, wherein the COC is a copolymer comprising a cycloolefin monomer and an acyclic olefin.

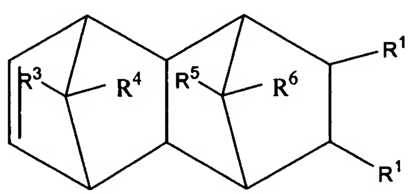
3. The film as claimed in Claim 2, wherein the cycloolefin monomer has (i) the polycyclic structure of formula I, II, III, IV, V or VI, or (ii) the monocyclic structure of the formula VII:



(I)



(II)



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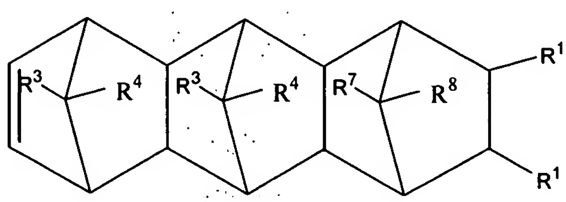
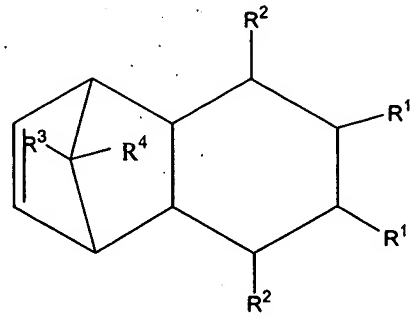
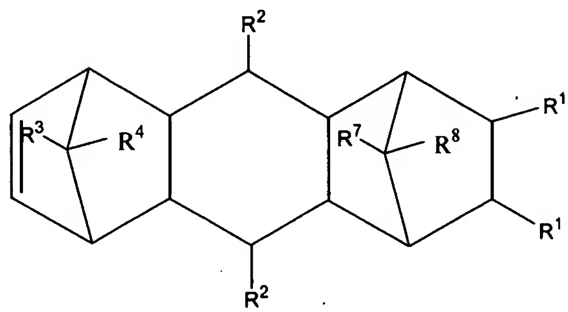


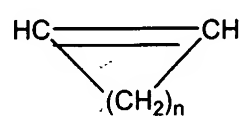
(IV)



(V)



(VI)



(VII)

wherein R^1, R^2, R^3, R^4, R^5, R^6, R^7 and R^8 are the same or different and are H, a C_6-C_{20} -aryl or C_1 -C_{20} -alkyl radical or a halogen atom, and n is a number from 2 to 10.

4. The film as claimed in Claim 3, wherein the cycloolefin monomer is selected from the group consisting of norbornene, cyclopentene, dimethyloctahydro-naphthalene, poly(5-methyl)norbornene and mixtures thereof.

5. The film as claimed in Claim 4, wherein the cycloolefin monomer is norbornene.

6. The film as claimed in Claim 2, wherein the acyclic olefin is selected from the group consisting of ethylene, propylene, butylene and mixtures thereof.

7. The film of Claim 2, wherein the COC is a copolymer of norbornene and ethylene.

8. The film of Claim 1, additionally comprising at least one layer comprising a thermoplastic polymer laminated to the at least one layer consisting essentially of the COC.

9. The film of Claim 8, wherein the at least one thermoplastic polymer layer and the at least one layer consisting essentially of COC are formed by coextrusion.

10. The film of Claim 9, wherein the coextrusion is performed using a flat-film die.

11. The film of Claim 9, wherein the coextrusion is performed by a blown film process.

12. The film of Claim 8, wherein the at least one thermoplastic polymer layer and the at least one layer consisting essentially of COC are laminated by adhesive bonding.

13. The film of Claim 8, wherein the at least one thermoplastic polymer is selected from the group consisting of polyester, polycarbonate, polyolefin, polyacrylate, polyestercarbonate, polyamide, polyketone, polyether, polyvinyl, cyclic olefin homopolymer and cyclic olefin copolymer, wherein the at least one thermoplastic layer has a Tg greater than that of the at least one layer consisting essentially of COC.

14. The film of Claim 13, wherein the thermoplastic is a polyester, polypropylene, polyethylene or nylon.

15. The film of Claim 14, wherein the thermoplastic is selected from the group consisting of polyethylene terephthalate and polybutylene terephthalate.

16. The film of Claim 8, wherein the laminate is further heat sealed to another layer via the heat sealable COC polymer layer.

17. A heat sealed package comprising a film of Claim 8.

18. The package according to Claim 17, wherein the heat seal is effected at a sealing temperature of from about 50 to about 80°C.

19. The film according to Claim 1, wherein the film exhibits a maximum hot tack strength value at a heat sealing temperature below about 75°C and exhibits a hot tack strength value of at least about 10% of that maximum value at heat sealing temperatures of from about 90°C to about 150°C.

20. The film according to Claim 1, wherein the film exhibits a maximum hot tack strength value at a heat sealing temperature below about 75°C and exhibits a hot tack strength value of at least about 20% of that maximum value at heat sealing temperatures of from about 90°C to about 150°C.

21. The film according to Claim 1, wherein the film exhibits a maximum hot tack strength value at a heat sealing temperature below about 75°C and exhibits a hot tack strength value of at least about 30% of that maximum value at heat sealing temperatures of from about 90°C to about 150°C.

22. The film according to Claim 1, wherein the film exhibits a maximum ultimate strength value at a heat sealing temperature below about 90°C and exhibits an ultimate strength value of at least bout 25% of that maximum value at heat sealing temperatures of from about 100°C to about 150°C.

23. The film according to Claim 1, wherein the film exhibits a maximum ultimate strength value at a heat sealing temperature below about 90°C and exhibits an ultimate strength value of at least bout 50% of that maximum value at heat sealing temperatures of from about 100°C to about 150°C.

24. A method of sealing a heat sealed package comprising providing a film of Claim 1 and heat bonding the film to another layer at a heat seal temperature of from about 50°C to about 80°C.

25. A method of heat sealing comprising:

(a) providing a first film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C;

(b) providing a second film having at least one layer consisting essentially of a COC, wherein the COC has a Tg of from about 30 to about 55°C; and

(c) heat-sealing the first and second films together wherein the sealing temperature is from about 50 to about 80°C.

26. A heat sealable film consisting essentially of a film forming norbornene/-ethylene copolymer having a Tg of from about 30°C to about 55°C, a film of the film forming copolymer exhibiting a hot tack strength of greater than 10N when tested at a heat seal temperature below about 75°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 0.1 second, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s.

27. A heat sealable film consisting essentially of a film forming norbornene/-ethylene copolymer having a Tg of from about 30C to about 55C, a film of the film forming copolymer exhibiting a hot tack strength of greater than 10N when tested at a heat seal temperature below about 75°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 0.1 second, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s, wherein further a film of the film forming copolymer exhibits a hot tack strength of greater than about 5N at all heat seal temperatures between about 75°C and 150°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 0.1 second, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s.

28. A heat sealable film consisting essentially of a film forming norbornene/-ethylene copolymer having a Tg of from about 30°C to about 55°C, a film of the film forming copolymer exhibiting an ultimate seal strength of greater than 10N when tested at a heat seal temperature below about 90°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 30 seconds, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s.

29. A heat sealable film consisting essentially of a film forming norbornene/-ethylene copolymer having a Tg of from about 30°C to about 55°C, a film of the film forming copolymer exhibiting an ultimate seal strength of greater than 10N when tested at a heat seal temperature below about 90°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 30 seconds, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s, wherein further a film of the film forming copolymer exhibits an ultimate seal strength of greater than about 20N at all heat seal temperatures between about 90°C and 150°C at a seal pressure of 44 psi, a seal time of 1 second, a cooling time of 0.1 second, a film sample width of 1 inch and a film sample thickness of 2 mil, wherein the peel speed is 200 mm/s.

30. A cycloolefin copolymer consisting of norbornene and ethylene, wherein the cycloolefin copolymer has a Tg of from about 30 to about 55°C and wherein the norbornene is present in an amount of from about 24 to about 30 mole percent and wherein the ethylene is present in an amount of from about 76 to about 70 mole percent.

IX-EVIDENCE APPENDIX

Attached are a July, 2005 *Declaration of Randy D. Jester* and a November 2005 *Declaration of Randy D. Jester*.

STATEMENT INDICATING ENTRY INTO RECORD

The July, 2005 *Declaration* was entered into the record on or about July 12, 2005, according to the PAIR system.

The November, 2005 *Declaration* was entered into the record on or about December 7, 2005, according to the PAIR system.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :

Randy D. Jester : Examiner: S. M. Rayford

U.S. Serial No. 10/720,028 : Group Art Unit: 1772

Filed November 21, 2003 :

Docket No. 1725 (TI-02-03) :

For: CYCLOOLEFIN COPOLYMER HEAT SEALABLE FILMS AND PACKAGING INCORPORATING SAME :

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 CFR 1.132

Randy D. Jester, inventor of the subject matter of the above-noted patent application hereby declares that:

1. That he was awarded a BS and MS in Chemical Engineering degree from NC State University and has worked in the field of polymer technology for 27 years, and that he is a co-inventor of the pending '028 application referenced above.

2. That he understands from Counsel that the pending claims have been rejected over United States Application Publication No. 2002/0156195A1 of *Hausmann*, as well as

United States Patent No. 5,532,030 to *Hirose et al.*, and that he is familiar with the references referred to in making those rejections.

3. That he makes this *Declaration* on personal knowledge of the facts stated herein.

4. That claim 1 of the pending application is representative of the subject matter claimed:

> <u>Claim 1</u>. A heat-sealable film suitable for heat sealing at low temperatures comprising at least one layer consisting essentially of a cycloolefin copolymer (COC), wherein the COC has a Tg of from about 30 to about 55°C.

5. That low temperature sealing (generally less than about 80°C) is desirable in several applications, notably the packaging industry, because it is suitable for many commercial processes and allows for higher production speeds. That the claimed glass transition temperature is critical to the heat sealing performance of the invention.

6. That, in his technical opinion, neither the *Hausmann* nor the *Hirose* reference provide guidance to a person of ordinary skill in the art on how to make films which are suitable for low temperature heat sealing, or which contain a layer consisting essentially of a cycloolefin copolymer with a Tg of between about 30 and 55 °C. That this opinion is based, in part, on the absence of any teaching in those references of which, if any, COC resins would be suitable for low temperature applications or how much resin to use.

7. That the inventive films enable the production of seals with unexpectedly high strengths at low sealing temperatures. That the high strength values are unexpected because the glass transition temperatures of the COC resins are much lower than most conventional heat sealing resins, and that one would expect a significant decrease in seal strength based on the Tg values used. That the high strengths of the present invention are shown in **Figures 1** and **2**, reproduced below, where the inventive low temperature seals have higher hot tack strengths and comparable or better ultimate seal strengths than standard films.

Figure 1

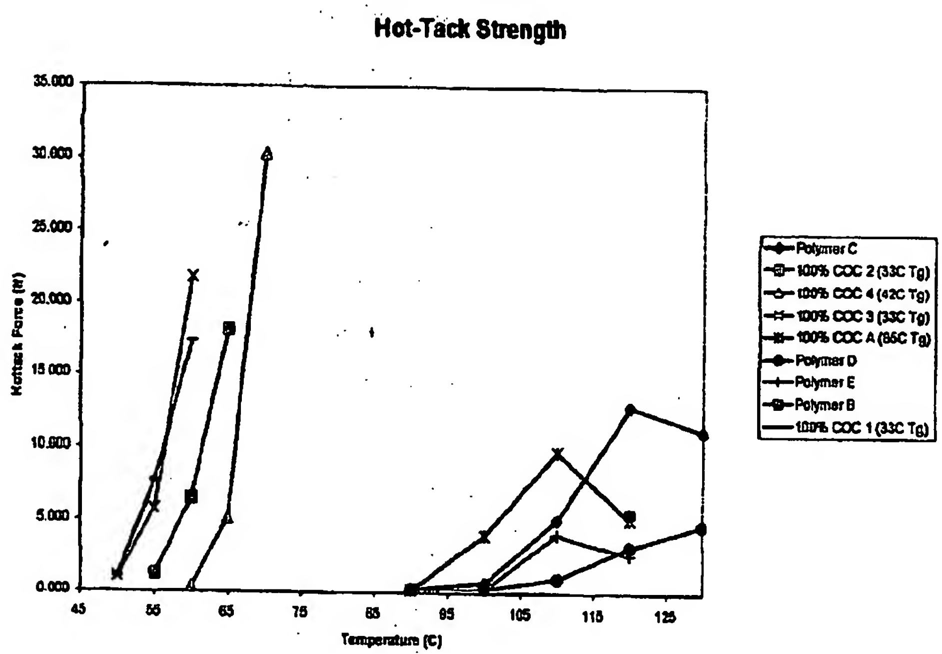
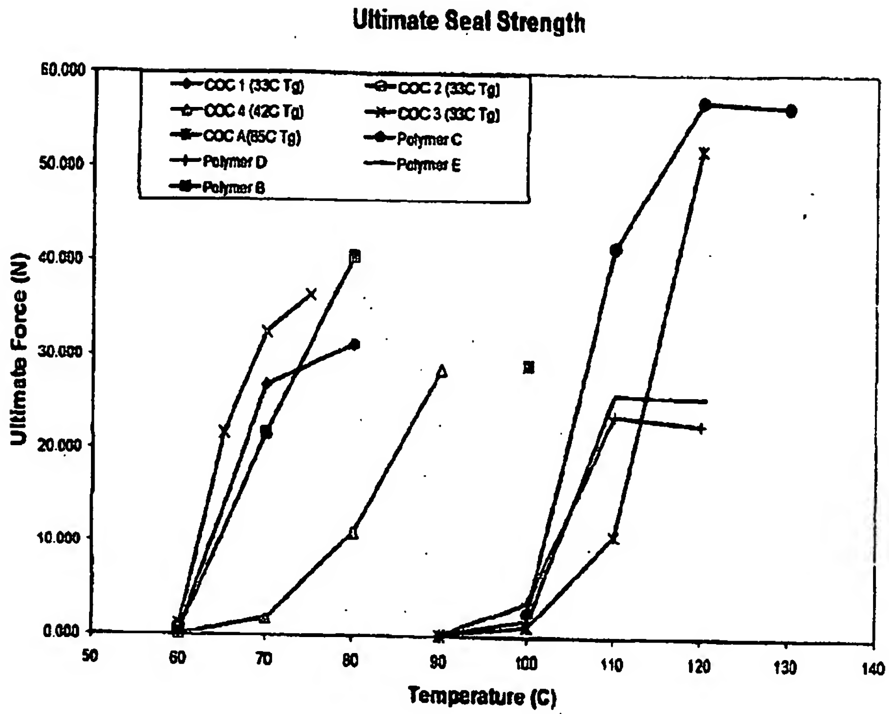


Figure 2



8. That it is also surprising that the films which consist essentially of COC resin perform markedly better for low-temperature applications than blends of COC having modest amounts of another polyolefin. That this opinion is based on Samples 35-38 of the pending application which show that blends having even 20 % of LLDPE reach their peak seal strength values at temperatures substantially higher than the inventive films.

9. That the inventive films have a combination of properties that are not expected, and are highly desirable for low-temperature heat seal applications. That these properties include high hot tack strengths, high ultimate strengths, and good processability over a broad temperature range. That Figs. 5 and 6, below, specifically illustrate that the films may be processed over a relatively broad range of temperatures. That, in his technical opinion, the heat sealing properties of the films are likely unique to the claimed range and amount of COC; and that he bases this opinion, in part, on the

comparative examples in the specification where it can be seen that polymers with higher Tg's appear to have higher seal temperatures and lower hot tack values.

Figure 5

Hottack Seal Strength, 100% COC

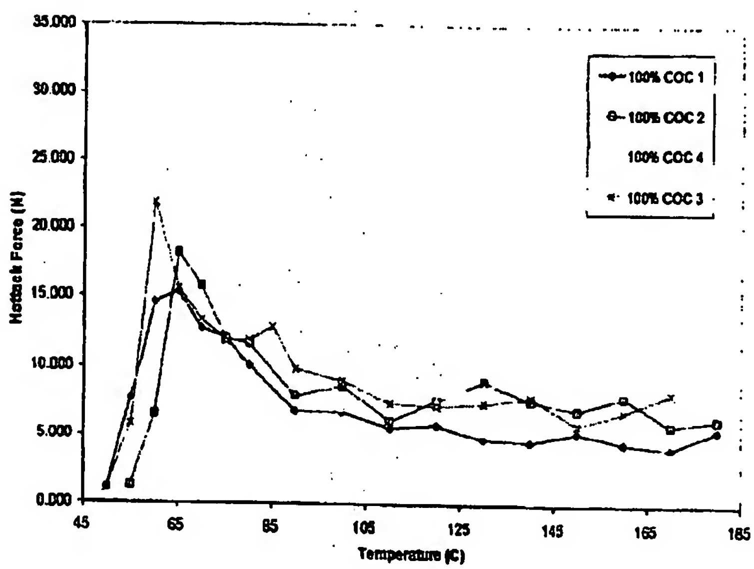
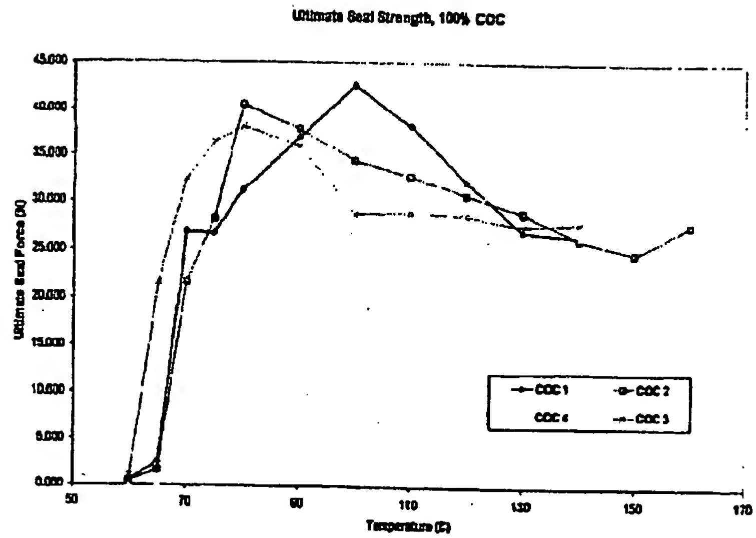


Figure 6



10. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated July 7 '2005

Randy D. Jester

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: :

Randy D. Jester : Examiner: M. Miggins

U.S. Serial No. 10/720,028 : Group Art Unit: 1772

Filed November 21, 2003 :

Docket No. 1725 (TI-02-03) :

For: CYCLOOLEFIN COPOLYMER HEAT SEALABLE FILMS AND PACKAGING INCORPORATING SAME :

Assistant Commissioner for Patents
Washington, D.C. 20231

DECLARATION UNDER 37 CFR 1.132

Randy D. Jester, inventor of the subject matter of the above-noted patent application hereby declares:

1. That he was awarded BS and MS degrees in Chemical Engineering from North Carolina State University and has worked in the field of polymer technology for 27 years, and that he is the sole inventor of the subjected matter of United States Patent Application Serial No. 10/720,028 entitled "*Cycloolefin Copolymer Heat Sealable Films and Packaging Incorporating Same*" referenced above, and makes this *Declaration* in support of patentability.

2. That he understands from Counsel that the pending claims have been rejected over United States Patent No. 5,532,030 to *Hirose et al.*, among other references, and that he is familiar with the '030 *Hirose et al.* patent.

3. That he makes this *Declaration* on personal knowledge of the facts stated herein.

4. That claim 1 of the pending application is representative of the claimed subject matter:

   Claim 1. A heat-sealable film suitable for heat sealing at low temperatures comprising at least one layer consisting essentially of a cycloolefin copolymer (COC), wherein the COC has a Tg of from about 30 to about 55°C.

5. That the *Hirose et al.* reference discloses a polyolefin multilayer laminate containing a cycloolefin-based resin that has a softening temperature in preferred ranges of from 50°C to 180°C, as is seen in column 3:

   The cycloolefin-based resin (A1) to be employed according to the present invention has a softening temperature (TMA) of usually −40° C. or higher, preferably 0°–180° C., more preferably 50°–180° C., as determined on a Thermal Mechanical Analyzer. The softening temperature (TMA) is

6. That the softening temperature referred to in column 3 of the *Hirose et al.* reference is not the equivalent of the glass transition temperature of the resin. The softening temperature and the glass transition temperature are two separate characteristics of a resin which are measured by two entirely different procedures. For example, as stated in *Hirose et al* at column 3, lines 47-55, the softening temperature is the temperature at which a needle penetrates a sheet of the plastic to a depth of 0.635

mm, under a 49 gram load. The softening temperature is measured on a Thermal Mechanical Analyzer (TMA). By contrast, the glass transition temperature is the temperature of the endotherm in a differential scanning calorimetry analysis of the resin.

7. That the glass transition temperature and the softening temperature of a resin are generally not used interchangeably in the field of polymer science, and that the Tg and softening temperature values of a given resin are typically not the same.

8. That it is known to the Declarant that cycloolefin copolymers generally have glass transition temperatures which are approximately 7-10°C higher than their softening points. That cycloolefin copolymers with softening temperatures in the range of from 50°C to 180°C would not have Tg's of from 30 to 55°C. That, in his technical opinion, the *Hirose et al.* reference does not suggest to use COC resins with Tg's in the range of 30°C to 55°C.

9. The undersigned Declarant declares further that all statements made herein of his own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the subject application or any patent issuing thereon.

Dated 11/21/05

Randy D. Jester

X-RELATED PROCEEDINGS APPENDIX

There are no related appeals, interferences, or judicial proceedings which are related to, or which will affect, or which will be affected by, or which will have a bearing on the Board's decision in this appeal.